WHAT IS CLAIMED IS:

1. A granular perpendicular magnetic recording medium comprising:

a non-magnetic substrate; and

a magnetic alloy layer overlying the substrate, wherein:

the magnetic alloy comprises cobalt (Co), platinum (Pt) and 0.1 to 15 at.%, titanium dioxide (TiO_2);

the molar ratio of Pt:Co is no greater than 0.5;

TiO_2 is dispersed at grain boundaries of the magnetic alloy; and

substantially no silicon dioxide is present at the grain boundaries.

2. The granular perpendicular magnetic recording medium according to claim 1, further comprising:

at least one underlayer between the non-magnetic substrate and the magnetic alloy layer; and

a carbon-containing protective overcoat on the magnetic alloy layer.

3. The granular perpendicular magnetic recording medium according to claim 2, further comprising up to 10 at.% of at least one element selected from the group consisting of chromium (Cr), molybdenum (Mo), tantalum (Ta), niobium (Nb), boron (B), iron (Fe), nickel (Ni), vanadium (V), germanium (Ge), palladium (Pd), and copper (Cu).

4. The granular perpendicular magnetic recording medium according to claim 3, wherein the Pt content is 10 to 30 at.%.

5. The granular magnetic recording medium according to claim 4, wherein the TiO_2 content is 3 to 8 at.%.

6. The granular perpendicular magnetic recording medium according to claim 5, wherein the Pt content is 15 to 25 at.%.

7. The granular perpendicular magnetic recording medium according to claim 4, wherein 50% to 100% of the TiO_2 present in the magnetic alloy is segregated at the grain boundaries.

8. The granular perpendicular magnetic recording medium according to claim 4, wherein substantially all of the TiO_2 present in the magnetic alloy is segregated at the grain boundaries.

9. The granular perpendicular magnetic recording medium according to claim 4, comprising:

a first underlayer on the substrate;

a second underlayer on the first underlayer;

a third underlayer on the second underlayer;

an intermediate layer on the third underlayer;

the magnetic layer on the intermediate layer; and

a carbon-containing overcoat on the magnetic layer.

10. The granular perpendicular magnetic recording medium according to claim 9, wherein:

the substrate comprises an aluminum or aluminum alloy having a layer of nickel-phosphorous plated thereon;

the first underlayer comprises titanium or an alloy thereof;

the second underlayer comprises an alloy of iron, cobalt and boron;

the third underlayer comprises silver; and

the intermediate layer comprises an alloy of ruthenium and chromium.

11. The granular magnetic recording medium according to claim 10, wherein:

the first underlayer has a thickness of 5Å to 50Å;

the second underlayer has a thickness of 500Å to 4,000Å;

the third underlayer has a thickness of 10Å to 30Å; and

the intermediate layer has a thickness of 50Å to 300Å.

12. A method of manufacturing a granular perpendicular magnetic recording medium, the method comprising sputter depositing a magnetic alloy layer, at a temperature no greater than 100°C, over a non-magnetic substrate, wherein:

the magnetic alloy comprises cobalt (Co), platinum (Pt), and 0.1 to 15 at.% titanium dioxide (TiO_2);

the molar ratio of Pt:Co is no greater than 0.5;

TiO_2 is dispersed at grain boundaries of the magnetic alloy; and

essentially no silicon dioxide is present at the grain boundaries.

13. The method according to claim 12, comprising depositing at least one underlayer over the substrate, and sputter depositing the magnetic alloy over the underlayer.

14. The method according to claim 13, comprising sputter depositing the magnetic alloy at a temperature of about 25°C.

15. The method according to claim 14, comprising sputter depositing the magnetic alloy using a single target containing the magnetic alloy and TiO_2.

16. The method according to claim 14, comprising sputter depositing the magnetic alloy using a separate target containing the magnetic alloy and a separate target containing TiO_2.

17. The method according to claim 14, comprising reactive sputter depositing the magnetic alloy in an atmosphere containing argon and oxygen.

18. The method according to claim 17, comprising reactive sputter depositing the magnetic alloy using a separate target comprising the magnetic alloy and a separate target comprising titanium.

19. The method according to claim 17, comprising reactive sputter depositing of the magnetic alloy using a single target comprising the magnetic alloy and titanium.

20. The method according to claim 14, wherein the magnetic alloy comprises Pt in an amount of 10 to 30 at.% and up to 10% of at least one element selected from the group consisting of chromium (Cr), molybdenum (Mo), tantalum (Ta), niobium (Nb), boron (B), iron (Fe), nickel (Ni), vanadium (V), germanium (Ge), palladium (Pd), and copper (Cu).